

Case Study Number 7-3

Estimating PM₁₀ and PM_{2.5} Emissions from Road Construction Activities

Exercise Objective

This exercise will test your ability to apply the methodology used to estimate emissions from road construction activities.

Directions

- Review the background information and data provided.
- Convene groups of 4-5 people.
- Answer the questions in the “Problem” section. These will guide you in your thinking to organize the data and then using it to estimate emissions.
- You will have 15 minutes to complete these tasks before the class reconvenes for discussion. Each group will be assigned specific questions and asked to present its results. Other groups will be asked if they agree or disagree with the findings.

Background

This hypothetical case study involves developing a local inventory using available county level inventory data and filling the data gaps with the NEI default data. In this case study the county officials have provided estimates of the miles of roadway constructed in the county.

Available Data

The following table shows a summary of the data that are available for use in the case study.

Data for Road Construction Case Study	
Miles of roadway constructed	12.3 miles
Duration	12 months

In addition, the Thornthwaite Precipitation Evaporation Index for the soil in the county being inventoried is 6, and the dry silt content of the county is 40 percent.

Problem

You have been asked by your supervisor to develop an estimate of fugitive dust emissions from the road construction activities in the past year. It is suggested that you approach the problem in the following manner.

1. What PM emission factors are applicable to road construction?
2. What is the basis of the activity data for road construction?
3. What is the methodology for estimating PM₁₀ and PM_{2.5} emissions from road construction?
4. What is your estimate of the PM₁₀ and PM_{2.5} emissions from the road construction activities in the county within the past year without accounting for rule effectiveness, rule penetration, soil moisture, and silt content?
5. What is your estimate of the PM₁₀ and PM_{2.5} emissions from the road construction activities in the county within the past year accounting for control efficiency and rule penetration, but not for soil moisture and silt content?

6. What is your estimate of the PM_{10} and $PM_{2.5}$ emissions from the road construction activities in the county within the past year accounting for control efficiency, rule penetration, and soil moisture?

7. What is your estimate of the PM_{10} and $PM_{2.5}$ emissions from the road construction activities in the county within the past year accounting for control efficiency, rule penetration, and silt content (but not soil moisture)?

8. What is your estimate of the PM_{10} and $PM_{2.5}$ emissions from the road construction activities in the county within the past year accounting for control efficiency, rule penetration, soil moisture, and silt content?

Notes

- Assume that all roads fall into the urban collectors category.
- Assume a Rule Effectiveness of 100%
- Assume a Control Efficiency of 50%
- Assume a Rule Penetration of 75%